

Appl. No. 10/023,936
Amdt. Dated: August 15, 2005
Reply to Advisory Action of: August 4, 2005

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of claims:

Claim 1 (Currently Amended). A method of producing a hot rolled steel sheet having a yield strength measured in a transverse direction of less than about 43 ksi, from molten steel, said sheet having increased formability and low slivering, the method comprising the steps of:

- a) measuring the total nitrogen concentration of the molten steel, said total nitrogen concentration consisting of a first portion and a second portion of nitrogen;
- b) adding a sufficient amount of titanium to the molten steel to bind with a first said first portion of the total nitrogen to form TiN, thereby leaving a second said second portion of total nitrogen;
- c) adding a sufficient amount of boron to the molten steel to bind with the second portion of the total nitrogen to form BN; and,
- d) hot rolling the steel.

Claim 2 (Currently Amended). ~~The method of claim 1~~ A method of producing a hot rolled steel sheet having a yield strength measured in a transverse direction of less than about 43 ksi, from molten steel, said sheet having increased formability and low slivering, the method comprising the steps of:

- a) measuring the total nitrogen (N) concentration of the molten steel;
- b) adding a sufficient amount of titanium (Ti) to the molten steel to bind with a first portion of the total nitrogen to form TiN, thereby leaving a second portion of total nitrogen;
- c) adding a sufficient amount of boron (B) to the molten steel to bind with the second portion of the total nitrogen to form BN; and,
- d) hot rolling the steel;

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wherein the amount of Ti added is sufficient to reduce the amount of the second portion of total nitrogen to a concentration within the range of:

$$0.0005 \text{ wt\%} \leq N^* \leq 0.0025 \text{ wt\%}$$

where:

N^* is the second portion of total nitrogen and wherein:

$$N^* = N_{\text{tot}} - (\text{Ti}/3.42);$$

N_{tot} is the total nitrogen as measured in wt%; and,

Ti is the amount of titanium added in wt%.

Claim 3 (Original). The method of claim 2 wherein the amount of N^* is about 0.0012 wt% to about 0.0022 wt%.

Claim 4 (Original). The method of claim 3 wherein the amount of boron added to the molten steel is about 0.0005 wt% to about 0.0025 wt%.

Claim 5 (Original). The method of claim 4 wherein the amount of boron added to the molten steel is about 0.001 wt% to about 0.002 wt%.

Claims 6 to 11 (Previously Canceled).

Claim 12 (Currently Amended). A method of producing a low yield strength hot rolled steel sheet having a yield strength measured in a transverse direction of less than about 43 ksi, from molten steel, said steel sheet having increased formability and low slivering, the method comprising the steps of:

- a) measuring the total nitrogen concentration of the molten steel;
- b) adding sufficient amounts of titanium and boron to the molten steel such that said titanium and boron bind with the total amount of nitrogen contained in the molten steel, said titanium and boron being provided in a proportion wherein the range of a stabilization ratio, SR corresponding to the relationship:

$$(B/0.77 + \text{Ti}/3.42)/N_{\text{tot}}$$

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is

$$0.7 \leq SR \leq 2$$

where:

 N_{tot} is the total nitrogen as measured in wt%and the range of the boron bound to nitrogen remaining after Ti addition, $B \times N^*$ is

$$0 \text{ wt}\%^2 < B \times N^* \leq 4.5 \times 10^{-6} \text{ wt}\%^2;$$

where:

$$N^* = N_{\text{tot}} - (\text{Ti}/3.42); \text{ and}$$

c) hot rolling the steel.